

**ABERRANT WING VENATION IN THE GREEN LACEWING
APOCHRYSA LUTEA (WALKER) (NEUROPTERA: CHRYSOPIDAE:
APOCHRYSINAE)**

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Abstract

An example of highly aberrant wing venation in a specimen of *Apochrysa lutea* (Walker) from southeastern Queensland is described and discussed in light of recently revised generic definitions in the subfamily Apochrysininae.

Introduction

Members of the green lacewing subfamily Apochrysininae are typically large chrysopids with broad, rounded wings and densely reticulated venation. Apochrysininae are pantropical in distribution, with greatest species richness in the Oriental and Australasian regions (Brooks and Barnard 1990, Winterton and Brooks 2002). Adults are weak fliers and fly with a slow, fluttering motion. They are almost always associated with dense, humid forests (Tjeder 1966, Tsukaguchi 1995, Winterton 1995, Penny 2002). *Apochrysa* Schneider (*sensu* Winterton and Brooks 2002) is an Old World genus represented by four species in Madagascar and southern and eastern Africa, one species in Japan and Taiwan, and six species in eastern Australia, Indonesia and Oceania (Kimmins 1952, Brooks and Barnard 1990, Hölzel 1996, Winterton 2002). Originally divided into six genera (*i.e.* *Anapochrysa* Kimmins, *Apochrysa*, *Nacaura* Navás, *Oligochrysa* Esben-Petersen, *Lauraya* Winterton and *Synthochrysa* Needham), these were all synonymised with *Apochrysa* by Winterton and Brooks (2002), thereby broadening the definition of the genus.

For many years, the taxonomy and classification of Apochrysininae was considered unsatisfactory, with generic concepts narrowly defined based on wing venation. This resulted in numerous monotypic genera and new species requiring default placement into new genera (Brooks and Barnard 1990, Brooks 1997). In light of this, Winterton and Brooks (2002) used a quantitative phylogenetic analysis to identify likely synonymies throughout the subfamily and reduced the total number of genera from 13 to six. Moreover, they broadened remaining generic concepts so that they were inclusive rather than exclusive in nature, thus allowing newly described taxa to be placed in existing genera rather than requiring the erection of new ones.

A female specimen from Australia, clearly belonging in Apochrysininae but with highly aberrant wing venation, is described and discussed here. Under the previous strict generic definitions, this specimen would probably have been described as a new species in a new monotypic genus but, under the revised concept, it can now be placed in the genus *Apochrysa* simply as an aberrant form of *A. lutea* (Walker).

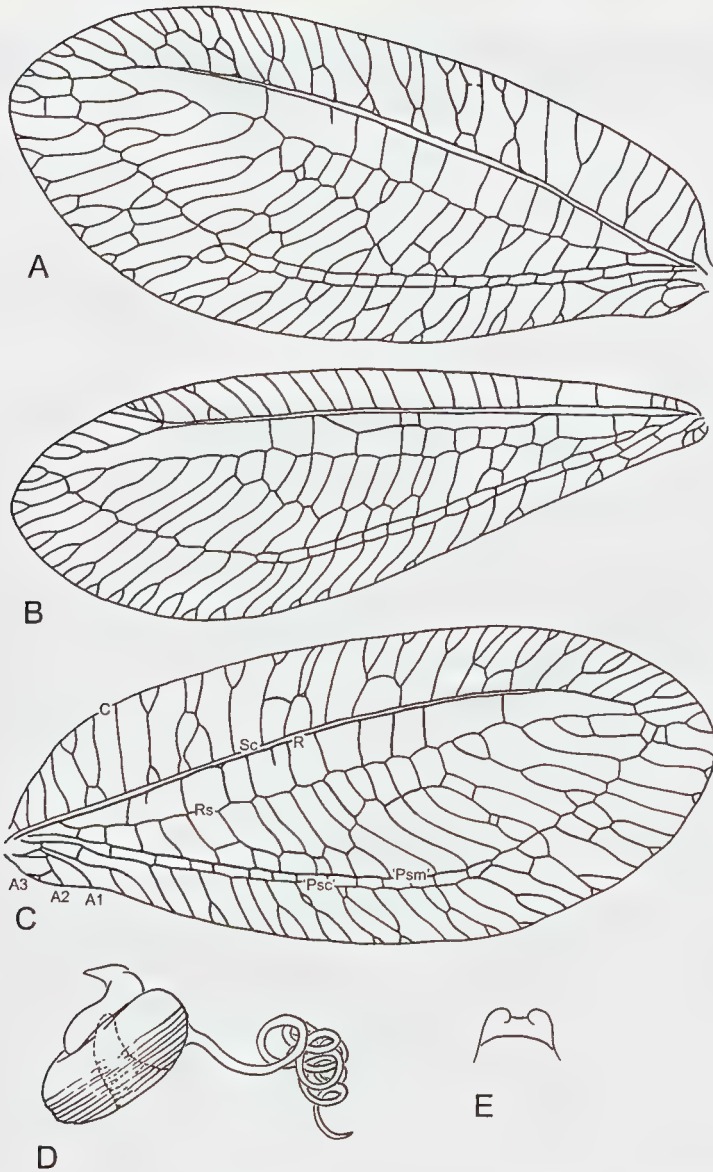


Fig. 1. Wings of aberrant specimen of *Apochrysa lutea* (Walker): A, left forewing; B, left hind wing; C, right forewing (forewing length = 18.0 mm.); D, spermatheca; E, subgenitale. Abbreviations: C, costal vein; Sc, subcostal vein; R, radial vein; Rs, radial sector; 'Psm', pseudomedial vein; 'Psc', pseudomedial vein; A1, A2 and A3, anal veins.

Apochrysa lutea (Walker)

(Fig. 1)

Material examined. 1 ♀, AUSTRALIA: Queensland: Brisbane, 1933, A.R. B[rimble]combe (in Queensland Department of Primary Industries and Fisheries Collection, Indooroopilly). Condition fair; right hind wing mostly missing, genitalia in genitalia vial attached to pin.

Description (Fig. 1). Wing venation abbreviations are those used by Brooks and Barnard (1990). Forewing length: 18 mm. Wings unmarked; venation pale yellow in old specimen; setae along wing veins relatively long; pterostigma indistinct; vein *C* equidistant with *Sc* along most of length in both wings; forewing costal crossveins irregularly shaped, either simple, forked or fused together (Figs 1A, C), sometimes joined by secondary crossveins, hind wing costal crossveins simple except near apex of wing; *Sc* short, very closely associated with *R* along entire length; *R* and *Rs* joined by simple crossveins along basal half of wing, a single crossvein between the two veins in distal half of wing, several incomplete 'spurious' veins arising posteriorly from *R* in forewing; hind wing with short additional longitudinal vein between veins *R* and *Rs* (Fig. 1B); 'end-twigging' of veinlets along posterior margin of both wings is irregular and shallow; right forewing (Fig. 1C) *Cu*₂ directed posteriorly and joins posterior margin of wing, thus making cell *c*₂ open and discal cubital cell (*dcc*) absent; vein 1A simple.

Comments. The above female was collected at Brisbane in 1933 and no other similar specimens have been located in the QDPI&F collection or in any other collections. Venation of left and right forewings in this specimen is asymmetrical. In the right forewing the anterior branch of *Cu*₂, which normally joins to the *Psc* and gives rise to the cell *c*₂ and the *dcc*, is directed posteriorly, joining the posterior margin of the wing, thus making cell *c*₂ open and the *dcc* absent.

Within the Apochrysinæ, such venational asymmetry is also present, to a lesser degree, in specimens of *Nobilinus bellula* (Banks) and *Loyola croesus* (Gerstaecker) in the United States National Museum collection (Washington D.C.) (pers. observ.). The wings of the above female fall well within the range of wing lengths recorded for *Apochrysa lutea* (e.g. New 1980), ruling out the generation of additional wing cross-veins based on increase in wing area. Moreover, such increases in wing area usually result only in production of secondary cross-veins and not additional longitudinal veins as in this specimen. A possible reason for this aberrant venation could be a developmental malformation, either spontaneous or due to extraneous factors such as limited food supply as a larva or environmental pollutants (Clarke 1993). Until further specimens are collected, indicating that this wing venation is actually fixed and represents a true species, I regard this specimen as merely a malformed individual of *A. lutea*.

The collection locality of this specimen is well within the known distribution of *A. lutea* (coastal areas of northern Queensland to central New South Wales), which is the only species of Apochrysinæ known from the Brisbane area. The basic elements of wing venation of *A. lutea* (see New 1980: figs 1-2) can be found in this specimen regardless of the many additional secondary veins. Similarly, the female genitalia are identical to those of *A. lutea* (Figs 1D, E). The distinct asymmetry of the left and right wings also supports the conclusion that the wing venation in this specimen is a malformation of the typical wing venation.

References

- BROOKS, S.J. 1997. An overview of the current status of Chrysopidae (Neuroptera) systematics. *Deutsche Entomologische Zeitschrift* **44**(2): 267-275.
- BROOKS, S.J. and BARNARD P.C. 1990. The green lacewings of the world: a generic review (Neuroptera: Chrysopidae). *Bulletin of the British Museum (Natural History), Entomology Series* **59**: 117-286.
- CLARKE, G.M. 1993. Patterns of developmental stability of *Chrysopa perla* L. (Neuroptera: Chrysopidae) in response to environmental pollution. *Environmental Entomology* **22**: 1362-1366.
- HÖLZEL, H. 1996. Neue Chrysopidae-Spezies aus Afrika I. *Apochrysa wagneri* n. sp. (Neuroptera: Chrysopidae). *Entomologische Zeitschrift* **106**: 117-120.
- KIMMINS, D.E. 1952. A revision of the Apochrysinæ (Fam. Chrysopidae). *Annals and Magazine of Natural History* **12**: 929-944.
- NEW, T.R. 1980. A revision of the Australian Chrysopidae (Insecta: Neuroptera). *Australian Journal of Zoology, Supplementary Series* **77**: 1-143.
- PENNY, N. D. 2002. A guide to the lacewings (Neuroptera) of Costa Rica. *Proceedings of the California Academy of Sciences* **53**: 161-457.
- TJEDER, B. 1966. Neuroptera-Planipennia. The lace-wings of Southern Africa. 5. Family Chrysopidae. Pp 228-534, in: Hanström, B., Brinck, P. and Rudebec, G. (eds), *South African Animal Life* Vol. 12. Swedish Natural Science Research Council, Stockholm; 1097 figs.
- TSUKAGUCHI, S. 1995. *Chrysopidae of Japan (Insecta, Neuroptera)*. Osaka, Japan; 224 pp, 106 figs.
- WINTERTON, S.L. 1995. A new genus and species of Apochrysinæ (Neuroptera: Chrysopidae) from Australia, with a checklist of Australian species. *Journal of the Australian Entomological Society* **34**: 139-145.
- WINTERTON, S.L. and BROOKS, S.J. 2002. Phylogeny of the apochrysin green lacewings (Neuroptera: Chrysopidae: Apochrysinæ). *Annals of the Entomological Society of America* **95**: 16-28.